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THE LOCATION OF PETROLEUM REFINERIES

More than half of the crude petroleum produced in the United States in the last thirty years has come from oil fields located in the Mid-Continent area. States in the Tenth Federal Reserve District contribute an important share to Mid-Continent oil production and also to the output of the Rocky Mountain oil fields. The Tenth District is somewhat less important, however, in the refining of petroleum than in its production. States in the District currently produce approximately 20 per cent of the crude oil output of the country but possess only around 10 per cent of total refining capacity. The location of refineries is obviously not determined solely by the geographic occurrence of crude petroleum; it is also influenced by the location of consuming markets and by differences in transportation costs. An investigation of the distribution of refining facilities throughout the country provides an explanation of the factors underlying refining location, as well as a basis for understanding recent developments in petroleum refining in the Mid-Continent and Rocky Mountain areas.

Locational Determinants Transportation costs constitute an important part of the market value of refined petroleum products. In order to minimize these costs, it has been logical, therefore, to locate refining activities at the source of crude oil, at marketing centers in the consuming areas, and at intermediate transshipment points between crude oil supplies and markets, where for some reason the journey is broken. The cost of refining petroleum has generally constituted only a minor portion of the final value of refined products, so that geographic differences in the cost of refinery operations have not been of great importance in determining refinery locations.

The ton-mile cost of moving petroleum and petroleum products by pipeline is less than half the cost of shipment by railroad tank car. Movement by tank ship or barge is, in turn, substantially less expensive on a ton-mile basis than by pipeline. It follows that tank car shipments are proportionally small, and water transportation is used wherever available, except in some cases where ice prevents winter transport for several months during the year and large storage costs are involved. Information made available by the Bureau of Mines on refinery receipts of crude petroleum in 1949 shows that almost three fourths of the crude oil was transported to refineries in pipelines and approximately a quarter by boat; tank car and truck shipments were less than 2 per cent of the total. Prior to the construction of pipelines for the movement of refined products, the various products were shipped overland primarily by tank car and, within local areas, by tank wagon or tank truck. Consequently, in order to reduce transportation costs between the producing fields and the markets for petroleum products, it was advantageous to locate refineries as close to potential markets as possible, or where water transportation could be used to marketing centers, in order to keep tank car shipments at a minimum.

The extensive construction of products pipeline facilities was initiated around 1930 for the movement of gasoline, kerosene, and distillates. This new transportation technique has the effect of making the location of refineries feasible anywhere from the source of crude oil supplies to the ultimate marketing centers, although there are still some advantages—such as greater longevity of marketing centers and adjacent markets for other refinery by-products—which favor market or water transshipment point locations. (Residual fuel oil is still shipped primarily by railroad tank car, thus constituting a locational pull toward large marketing centers.) Up to the present time, the use of product pipelines has not greatly altered the emerging pattern of refinery location, since product lines offer only an alternative to the construction of new crude lines. The develop-

ment of a comprehensive products pipeline network comparable to the existing crude pipeline network will obviously require some time and a large volume of capital investment. Perhaps the chief effect of products pipelines during the last twenty years has been to make more feasible the locations of a number of refineries in the Mid-Continent producing fields and to retard the migration of refining capacity away from the oil fields.

Primary Refining Centers Although circumstances peculiar to existing pipeline and refining facilities exert an important influence on the locational decisions of individual companies, the foregoing principles of refinery location can be readily demonstrated for the larger refineries which constitute approximately seven eighths of the refining capacity of the country. Of the total capacity of large refineries—those with a crude oil input capacity of 10,000 barrels per day or more—at the beginning of the year, 34 per cent was located at transshipment points along the Gulf Coast, from which locations refined products can be shipped by tanker or barge to the East Coast markets and to markets along the Mississippi waterway. Large refineries located chiefly in or near marketing centers in the Great Lakes-Midwest territory from Buffalo to Kansas City comprised another 22 per cent of the total. East Coast marketing centers possessed 16 per cent of the capacity of large refineries, and tidewater marketing centers and transshipment points in California accounted for a similar proportion. Large refineries located in or near the producing fields in the Mid-Continent region constituted only about 9 per cent of the total.

The Gulf Coast serves as the location for the largest concentration of refining capacity in the world. Almost a fifth of the crude petroleum produced in the United States comes from producing fields in the Gulf Coast area, and the East Texas, West Texas, North Texas, and Northern Louisiana-Southern Arkansas oil fields of the Mid-Continent area are in close proximity. Crude oil from these sources is channeled by pipeline to various centers along the Gulf Coast for processing, and refined products are loaded in tank ships and barges for shipment to the consuming areas. Both the Houston-Galveston Bay and Beaumont-Port Arthur areas possess refineries with a total crude oil handling capacity in excess of 700,000 barrels per day; each contains more than 10 per cent of all refining capacity in the country, as shown in Table 1. Other important refining centers on the Gulf Coast are the Baton Rouge, Lake Charles, Corpus Christi, and New Orleans areas.

Table 1. PRIMARY REFINING CENTERS IN THE UNITED STATES

Area	Capacity Barrels per Day	Per Cent of U. S. Total
Houston-Galveston Bay	742,700	10.7
Beaumont-Port Arthur	718,200	10.3
Los Angeles Basin	703,000	10.1
Philadelphia	575,500	8.3
Chicago	473,000	6.8
San Francisco Bay	343,300	4.9
New York	324,500	4.7
Baton Rouge	245,000	3.5
St. Louis	223,600	3.2
Total, 9 areas	4,348,800	62.5
United States	6,963,644	100.0

SOURCE: Bureau of Mines, Information Circular 7613, January 1, 1951.

The chief refining centers in the Great Lakes-Midwest region are the Chicago, St. Louis, Toledo, and Kansas City areas, in order of importance. Taken together, the refineries in these four metropolitan areas constitute approximately 14 per cent of the crude oil handling capacity of the country. Refineries are located in marketing centers and transshipment points on the Great Lakes at Chicago, Toledo, Detroit, Cleveland, and Buffalo. St. Louis refineries have access to a fairly large marketing territory by barge up and down the Mississippi River and its connecting waterways. Barge distribution along the Ohio River is also available to refineries in the Cincinnati and Ashland (Kentucky) areas. Kansas City is an important distribution center for petroleum products and also lies on crude and products pipeline routes from the producing fields to the consuming areas. Refining capacity in the Kansas City area is 96,200 barrels per day, 1.4 per cent of the national total. Other large refineries are located near the Illinois-Southwestern Indiana and Lima-Indiana producing fields.

On the East Coast most of the refining capacity is concentrated in the New York and Philadelphia areas, both of which serve large marketing territories of their own and have available all types of shipping facilities for the distribution of refined products to other domestic markets and to foreign markets. The Los Angeles Basin and San Francisco Bay areas are the primary refining centers on the Pacific Coast. Los Angeles provides an illustration of a situation where an important oil producing area, a refined products market, and an ocean and rail transshipment point coincide. In Los Angeles, refining capacity also exceeds 700,000 barrels per day, more than 10 per cent of the national total. The San Francisco Bay area receives crude petroleum by pipeline and tanker from the San Joaquin Valley and Coastal fields, and it distributes refined products throughout the vicinity by rail and by tanker to other points along the Pacific Coast and abroad.

Refining capacity in the Mid-Continent and Rocky Mountain producing areas is widely scattered and not

concentrated in any one locality. Tulsa is perhaps the focal point of Mid-Continent refining, with a capacity of 137,500 barrels per day within a forty-mile radius, of which Tulsa's own capacity is 82,000 barrels per day. Ponca City, Oklahoma, has facilities for handling 67,500 barrels of crude oil per day. Salt Lake City, with a still smaller capacity, is the largest refining center in the Rocky Mountain area. A larger volume of refining facilities is located at scattered points throughout Wyoming. Much of the refining capacity in the Rocky Mountain area is located near the source of crude oil supplies, but it is also favorably situated for the distribution of refined products to the Mountain states in comparison with outside refineries. This illustrates the fact that any producing area is a feasible location for refining activity as long as the immediate area provides a sufficiently large market. With the rapid growth in the consumption of gasoline and other petroleum products, more and more areas have fulfilled this requirement.

Small Refineries In contrast with the prevailing market orientation evident in the location of large refineries, many small refineries tend to cluster in the producing fields. Small refiners generally lack pipeline and tanker facilities for the efficient transportation of petroleum and must, therefore, locate their plants in the proximity of the oil fields in order to obtain continuing supplies of crude petroleum for processing. Large numbers of small refineries have sprung up in the past during the early flush stages of production in newly opened oil fields when the price of crude oil was depressed and when inadequate transportation and refining facilities existed for handling the oil. Moreover, many of these small refineries have been operated for only a few years before being shut down and dismantled.

Information on the average size of refineries arranged by areas clearly indicates the presence of the small and medium-sized refineries in the producing fields and the large refineries in the centers of population and at transshipment points. For example, the 23 refineries in the Lake Charles-Beaumont-Houston areas along the Gulf Coast have an average capacity of 73,000 barrels of crude oil per day, in comparison with an average capacity of 5,600 barrels per day for the nine refineries in the East Texas oil fields. The five refineries in the San Francisco Bay area possess an average daily capacity of 68,700 barrels, in contrast with an average of 8,500 for the eleven plants in the San Joaquin Valley producing area. Similarly, nine refineries in the Chicago area have an average capacity of 52,500 barrels per day, while the 38 refineries located in Kansas and Oklahoma (except Kansas City) have an average daily capacity of 12,500 barrels. In conformity with this general pattern, much of the refining capacity found in the Tenth Federal Reserve District consists of small and medium-sized refineries. The average capacity of the 79 refineries located in the Tenth District states is 9,000 barrels per day. In the country as a whole, the average refinery has a capacity of 19,500 barrels of crude oil per day.

The growth of the number and capacity of small refineries (those with a capacity of less than 10,000 barrels per day) has not kept pace with the over-all expansion of refining facilities in the last thirty years. The number of small refineries grew rapidly early in the 1920's, especially in California, and again in the early 1930's when the development of the East Texas oil field was occurring. However, the number and total capacity of small refineries are at the present time less than they were thirty years ago. During this period total refining capacity in the United States has more than tripled, as shown in Table 2. Because of the advantages of market locations, the growth of refined products markets, and the efficiencies of large-scale operation, the average size of refineries has increased from 4,400 barrels per day in 1922 to 19,500 barrels per day in 1951. The more rapid expansion of refining capacity in the marketing centers and transshipment point locations is apparent when the data on refinery growth are classified by region.

Regional Growth of Refining Capacity The capacity of large refineries in the various locations at several selected times in the past is shown in Table 2, along with the percentage increases from 1922 to 1951. The greatest quantitative increase in refinery facilities occurred along the Gulf Coast, although the rate of increase in that region was exceeded by the expansion which took place in the Great Lakes-Midwest region. The growth along the Gulf Coast was associated with the rapid increase in crude petroleum production in the Gulf Coast and Mid-Continent fields. Refineries were constructed at a number of Texas and Louisiana Gulf ports to process petroleum brought there by pipeline. These refineries served markets in the area, along the Mississippi waterway, on the East Coast, and abroad. To some extent the expansion of facilities on the Gulf Coast has occurred in preference to expansion along the East Coast. While large refining capacity increased 150 per cent from 1922 to 1951 on the East Coast, the rate of increase was less than half the national rate of expansion. New York was the largest refining center in the country in 1922, but by 1951 it was surpassed by both the Houston-Galveston

Table 2. LOCATION OF LARGE REFINERIES*

Area	Number of Large Refineries			Capacity in Barrels per Day			Per Cent Increase in Capacity
	1922	1935	1951	1922	1935	1951	1922-1951
Gulf Coast	11	17	26	290,000	725,000	2,079,450	617.1
Great Lakes-Midwest	6	19	34	100,500	425,000	1,331,000	1,224.5
East Coast	12	16	14	393,000	571,500	983,500	150.3
California: Tidewater	9	18	15	246,500	658,500	951,800	286.1
San Joaquin Valley	2	2	4	30,000	37,000	62,000	106.7
Mid-Continent	8	28	25	113,000	462,000	555,000	391.2
Rocky Mountain	2	1	7	70,000	12,600	139,600	99.4
Appalachian	0	3	1	0	30,000	14,000	—
United States, large refineries	50	104	126	1,243,000	2,921,600	6,116,450	392.1
United States, all refineries	479	631	357	2,109,200	4,058,500	6,963,644	230.2
United States large refineries as per cent of all refineries	10.4	16.5	35.3	58.9	72.0	87.8	—

*Refineries capable of handling 10,000 barrels or more of crude oil per day.
SOURCE: Bureau of Mines, Information Circulars 6850 and 7613.

Bay and Beaumont-Port Arthur areas on the Gulf Coast, as well as by several other centers throughout the country.

The development of petroleum refining activities in the Great Lakes-Midwest region has taken place in response to the locational advantages of marketing centers for the industry. The growth in large refining capacity in the region has exceeded 1,200 per cent during the last thirty years; its capacity now exceeds that in any other region except the Gulf Coast. The marketing territory served by refineries located in the Great Lakes-Midwest region has consistently consumed more than one third of all motor fuel used in the country, the most important refined product. Large refineries in the region constituted only 8 per cent of the total of such capacity in the entire United States in 1922. By 1951 capacity in the area had increased to 22 per cent of the national total. The overwhelming predominance of market locations in the region makes it evident that what has occurred has been a shift of the location of the refining industry in conformity with the locational requirements for cost reduction.

The capacity of large refineries in California has not increased as rapidly as the total for the entire country, although it has grown at a very substantial rate. This is accounted for by the fact that the rate of increase in the production of crude oil in California has lagged somewhat behind the rate for the United States, especially since 1929. In 1921, California oil fields produced 24 per cent of the national total; in 1950, California production constituted only 17 per cent of the total. The construction of large refineries at tidewater locations in California has been far more rapid than in the San Joaquin Valley producing fields, as Table 2 shows.

In the Mid-Continent area the increase in the capacity of large refineries has moved at a rate almost equal to that in the country as a whole during the last three decades. However, the expansion took place primarily between 1922 and 1935, when rapid and uncontrolled development occurred in many of the fields. Since 1935, the rate of growth has been only 20 per cent in the Mid-Continent area, in comparison with a national increase in large refining capacity of 109 per cent. Markets within the area are inadequate to absorb a large part of the petroleum produced, and it moves chiefly to the north and east either as crude oil or refined products for ultimate consumption. An important factor contributing to the continued feasibility and expansion of refining within the Mid-Continent area has been the development of products pipeline facilities. Product lines now carry Mid-Continent refined products cheaply to terminals in Kansas City, Omaha, Des Moines, Minneapolis, St. Louis, Chicago, Denver, and many other points. As a consequence, the Mid-Continent area has developed a large number of what may be described as medium-sized refineries. Twenty of its 25 refineries capable of handling more than 10,000 barrels of crude oil per day range in size from 10,000 barrels per day to 30,000 barrels per day, and the largest refinery in the area has a capacity of 56,000 barrels per day.

Petroleum refining in the Rocky Mountain region has largely followed the course of crude oil production in that area. Refining declined as the supplies of crude fell off from the mid-1920's to the mid-1930's but has since increased. Crude oil production and refined products output in the region do not currently exceed the regional demand for refined products, although there is some exchange, both in and out, with other areas.

In summary, marketing centers and tidewater transshipment points are the predominant locations of petroleum refineries in the United States at the present time. The nine largest refining centers in the country contain five eighths of the crude input capacity of all refineries. The location of cracking facilities, which are used to obtain greater yields of gasoline from intermediate refined products obtained by straight-run distillation, is not markedly

different. The location of further additions to refining facilities in the future will depend on the geography of crude oil production in relation to the refined products markets and the type of transportation facilities which can be made available. The development of products pipelines has removed some of the market attraction for the location of petroleum refining; the future construction of refineries will not be determined to any significant degree by transportation cost differences in the overland movement of crude oil and the primary refined products. At the present time, the opening of the Canadian oil fields and the possibility of large crude oil reserves in the Williston Basin of Montana, the Dakotas, and southern Saskatchewan make probable the appearance of new refining centers based on these sources —perhaps in the Minneapolis-St. Paul or Duluth-Superior areas.

BUSINESS AND AGRICULTURAL CONDITIONS

MEMBER BANK CREDIT

The volume of loans and investments at District member banks on September 26 totaled 4,899 million dollars and exceeded that of any previous monthly or call reporting date by 79 million dollars. This record volume combined 1,989 million of loans, 40 per cent of loan-investment volume, with 2,910 million of investments, chiefly Treasury securities, and provides a sharp contrast with the composition of District member bank portfolios at the end of 1945, when loans accounted for less than 20 per cent of the loan-investment total. The postwar years have seen a substitution of business, agricultural, real estate, and consumer loans in bank portfolios for Government securities, as well as an expansion in the total volume of bank credit extended.

During September, member bank holdings of loans increased by 20 million and those of investments by 59 million dollars, the latter figure reflecting a 64 million dollar increase in Government obligations and a 5 million dollar decrease in other securities. The larger part of the new loans were accounted for at country banks, while 45 million, or approximately 75 per cent, of the added investments occurred at reserve city member banks.

Time and total deposits also reached a new record volume in September at District member banks, with figures of 759 million and 6,479 million, respectively. The gain in time deposits, the eighth successive monthly increase this year, amounted to 7 million dollars, while demand deposits at reserve city banks increased by 154 million and at country banks by 45 million dollars.

In spite of the increases in both loan volume and Government security holdings, District member banks experienced an increase in reserves, cash, and bank balances totaling 118 million dollars. The bulk of this change occurred at city banks, where balances with banks in the United States and cash items in process of collection rose by 40 million and 57 million dollars, respectively.

DEPARTMENT STORE TRADE

Dollar volume of sales at reporting department stores in this District in September was only 3 per cent below the rather high level of a year ago, and in the first three weeks of October sales rose 9 per cent above the corresponding period last year. Sales increased more than is usual from August to September, and the seasonally adjusted index of daily average sales rose to 340 per cent of the 1935-39 average in September from 333 per cent in August and a level of around 315 per cent during the four preceding months April through July.

SELECTED ITEMS OF CONDITION OF TENTH DISTRICT MEMBER BANKS
(In millions of dollars)

	All Member Banks			Reserve City Banks			Country Banks		
	Sept.26 1951	Aug.29 1951	Sept.27 1950	Sept.26 1951	Aug.29 1951	Sept.27 1950	Sept.26 1951	Aug.29 1951	Sept.27 1950
Loans and investments	4,899	4,820	4,641	2,772	2,720	2,562	2,127	2,100	2,079
Loans and discounts	1,989	1,969	1,738	1,171	1,164	996	818	805	742
U. S. Government obligations	2,439	2,375	2,431	1,348	1,299	1,303	1,091	1,076	1,128
Other securities	471	476	472	253	257	263	218	219	209
Reserve with F. R. Bank	893	884	769	558	556	479	335	328	290
Balances with banks in U. S.	675	622	585	295	255	250	380	367	335
Cash items in process of collection	346	285	299	322	265	280	24	20	19
Gross demand deposits	5,720	5,521	5,295	3,346	3,192	3,019	2,374	2,329	2,276
Deposits of banks	959	918	818	895	855	760	64	63	58
Other demand deposits	4,761	4,603	4,477	2,451	2,337	2,259	2,310	2,266	2,218
Time deposits	759	752	684	405	401	367	354	351	317
Total deposits	6,479	6,273	5,979	3,751	3,593	3,386	2,728	2,680	2,593
Borrowings	20	29	20	18	25	19	2	4	1

Department store inventories, which usually increase during September, were little changed as compared with a month earlier, and the seasonally adjusted index of stocks dropped from 361 per cent of the 1935-39 average at the end of August to 346 per cent at the end of September, resuming the decline that had been under way since April but had been interrupted in August. Stocks of merchandise on hand at the end of September, however, still were 13 per cent larger in value than a year ago, while the volume of outstanding orders continued little more than half as large as that of a year earlier.

DEPARTMENT STORE SALES AND STOCKS

	Sales		Stocks
	Sept. '51 comp. to Sept. '50	9 Mos. '51 comp. to 9 Mos. '50	Sept. 30, '51 comp. to Sept. 30, '50
	(Per cent increase or decrease)		
Denver	−9	+1	+22
Hutchinson	−2	−1	+17
Topeka	+15	+9	+4
Wichita	+9	+14	+17
Joplin	+14	+6	0
Kansas City	−1	+2	+9
St. Joseph	−7	+1	*
Omaha	0	+5	+29
Oklahoma City	−13	−5	0
Tulsa	−2	0	+3
Other cities	−5	+1	+11
District	−3	+2	+13

*Not shown separately but included in District total.

CONSTRUCTION

Total expenditures for new construction in the United States in September declined less than 1 per cent from August and were less than 1 per cent below expenditures in September, 1950. Construction contract award figures for the 37 states east of the Rocky Mountains dropped 14 per cent from August to September, however, continuing the decline that has characterized recent months.

In the area consisting of western Missouri, Kansas, Nebraska, and Oklahoma, construction contracts increased 180 per cent from August to September, contrary to the national trend, and awards were slightly higher than in June of this year or in September a year ago. This fluctuation in construction contract awards was even more pronounced in Kansas and Greater Kansas City. Thus, it would appear that the July floods were partially responsible for the reduction of construction activity during July and August and for the subsequent recovery in September. Notable contractions in August and expansions in September in Nebraska and Oklahoma would indicate, however, that other factors also contributed to the unusual pattern of contract awards in this area. On October 8, the National Production Authority amended its directions under Controlled Materials Plan Regulations 5 and 6, thereby extending from 90 to 180 days the period in which self-authorization may be used to obtain materials for the reconstruction or repair of disaster damage to buildings, equipment, and supplies.

On October 1, construction became subject to the Controlled Materials Plan. Builders planning to commence construction during the fourth quarter of this year and using more than specified amounts of controlled materials were required to apply for permission and an allocation of the needed materials. The National Production Authority has announced that it turned down approximately 83 per cent of such applications received, owing to the short supply of steel, copper, and aluminum. Rejections were announced for all of the District states. The NPA has

BANK DEBITS

	Sept. 1951	9 Mos. 1951	Change from '50 Sept.	Change from '50 9 Mos.
	(Thousand dollars)		(Per cent)	
COLORADO				
Colo. Springs	55,849	501,169	+8	+28
Denver*	727,734	6,594,628	+10	+22
Grand Junction	16,794	153,581	−4	+14
Greeley	31,635	245,985	+23	+23
Pueblo*	48,766	471,575	+2	+20
KANSAS				
Atchison	9,937	96,922	−5	+9
Emporia	14,901	112,558	+17	+16
Hutchinson	38,816	367,060	−7	+9
Independence	8,192	72,422	+13	+14
Kansas City	82,084	776,440	+4	+21
Lawrence	11,595	108,969	+7	+16
Manhattan**	12,997	99,198	—	—
Parsons	11,028	81,349	+33	+17
Pittsburg	13,426	116,622	−2	+11
Salina	37,887	348,600	+5	+11
Topeka	98,044	920,617	+3	+10
Wichita	293,830	2,663,437	+15	+26
MISSOURI				
Independence**	11,468	113,102	—	—
Joplin	30,189	272,359	+1	+13
Kansas City	1,197,907	11,066,788	−2	+13
St. Joseph	107,280	1,020,412	−3	+15
NEBRASKA				
Fremont	18,910	183,673	−5	+11
Grand Island	35,620	269,790	+39	+27
Hastings	14,395	141,635	−8	+18
Lincoln*	89,607	833,944	−1	+12
Omaha	628,304	5,751,251	+2	+25
NEW MEXICO				
Albuquerque*	115,574	1,102,355	+2	+7
Santa Fe**	30,677	304,837	—	—
OKLAHOMA				
Bartlesville	182,351	1,558,168	+19	+30
Enid	33,992	330,552	+5	+5
Guthrie	4,467	42,751	−3	+9
Lawton**	19,886	165,659	—	—
Muskogee	28,466	247,342	+9	+9
Norman**	7,693	73,771	—	—
Oklahoma City*	374,683	3,514,732	−6	+9
Okmulgee	6,785	63,698	0	+4
Ponca City	20,174	188,680	−7	+10
Tulsa	616,951	5,495,034	+10	+23
WYOMING				
Casper	37,803	331,660	+10	+25
Cheyenne	36,302	330,330	+4	+19
District, 40 cities*	5,162,999	47,133,655	+4	+18
U. S., 342 cities	121,201,000	1,161,599,000	−2	+14

*Dollar figures include one or more additional reporting banks, beginning January, 1951; however, percentage changes shown are computed from comparable data for both 1951 and 1950.

**New reporting center, beginning January, 1951.

pointed out that these rejections relate only to the fourth quarter, so that builders may reapply for allotments in subsequent quarters. The bulk of the applications turned down were for commercial construction.

While construction activity for the country as a whole has been reduced over the past year, building of certain types, as well as construction in particular communities, is increasing. The President has recently signed the 5,864 million dollar military construction bill, and reactivation and expansion programs are under way at numerous military facilities located in the District states. The Rocky Flats atomic energy plant near Denver and the Atomic Energy Commission's low temperature laboratory at Boulder both are now in the early stages of construction. Rising employment at defense plants and at reactivated military facilities is causing attention to be focused on housing supply in a number of Tenth District communities. On October 19, Topeka was declared a critical defense area, the third District city to be so designated. Wichita and Colorado Springs also fall under this classification, which allows a relaxation of credit restrictions and provides eligibility for liberalized mortgage insurance for programmed defense housing. Large housing projects also are being planned to accommodate the influx of workers in Denver and several other District cities.

CROP PROSPECTS

The Bureau of Agricultural Economics in its general crop report based on conditions as of October 1 forecast a total output of all crops equal to that of 1949, which was the second largest on record. On a nationwide basis, production prospects declined during September for corn, cotton, spring wheat, oats, barley, flaxseed, dry beans, soybeans, potatoes, sweet potatoes, and peanuts. Improvement was noted for all hay, rice, sorghum grain, sugar beets, peaches, and several other minor crops.

A significant feature of the crop report is the continuing decline in prospects for feed grain production. Although the corn, oats, and sorghum grain crops are expected to be larger than the average 1940-49 production, this year's output is expected to be less than last year's crops in all instances. Barley production for 1951 is expected to be less than the 1940-49 average and also less than last year. Total production of all feed grains will continue to be large in comparison with production during most previous years, but livestock numbers are large and the demand for feed grains is expected to be high during the coming year.

According to the June Pig Crop Report, the total pig crop for 1951 is expected to be 106 million head, which would be the second largest on record and 16 per cent more than the 1940-49 average. The total number of cattle on farms by the end of this year is expected to approach 90 million head, which would be an all-time record high and 14 per cent more than the 1940-49 average. This large increase in cattle and pig numbers has been partially offset by decreases in horses, mules, and sheep. However, most of the decreased numbers occurred in the case of sheep, which do not consume feed grains to any substantial extent.

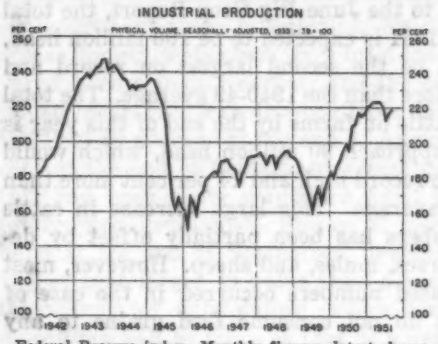
In contrast with the 16 and 14 per cent increases in pig and cattle numbers, respectively, feed grain production for 1951 will be only about 4 per cent larger than the average 1940-49 production. Livestock numbers are expected to continue their increase during the coming year. With these large numbers of livestock, feed grain production either must be expanded or declining reserves will force a halt to the expanding numbers of livestock on farms.

Fortunately, pasture conditions are good throughout most of the United States and promise good fall feed in most areas, although range pastures remain dry in many southern and western areas. A record hay crop of 114 million tons, together with a carryover of 16 million tons, will provide the largest hay supplies per roughage consuming animal unit of record. However, in some areas much of the hay crop is rain-damaged, coarse, and of poor feeding quality. This is particularly true throughout much of the territory in the Tenth District.

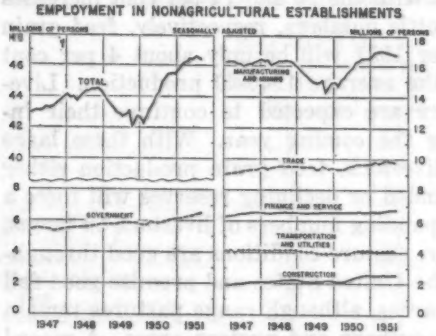
CROP PRODUCTION
(In thousands of units)

	Seven States		United States	
	Average 1940-49	Indicated 1951	Average 1940-49	Indicated 1951
Corn (bus.)	468,410	469,489	2,980,777	3,104,988
Wheat (bus.)	398,968	293,046	1,071,310	993,598
Oats (bus.)	174,927	132,711	1,311,651	1,372,248
Barley (bus.)	60,014	23,916	306,523	254,409
Sorghum grain (bus.)	40,649	66,594	118,772	163,996
Soybeans (bus.)	12,276	33,109	178,567	271,203
Hay (tons)	16,913	19,264	101,644	113,859
Sugar beets (tons)	3,015	3,167	9,880	10,682

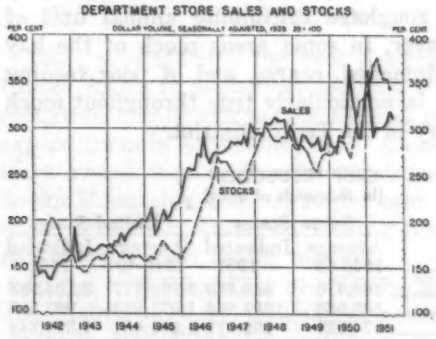
In the seven District states, production of corn is expected to approximate the 1940-49 average, that of oats and barley is expected to be considerably less than the average 1940-49 production, and that of sorghum grain is expected to be substantially higher than the average 1940-49 production. In terms of bushels, the 1951 production of oats is expected to be 42 million bushels less, barley 36 million bushels less, corn 1 million bushels more, and sorghum grain about 26 million bushels more than the average 1940-49 production for the seven-state area.



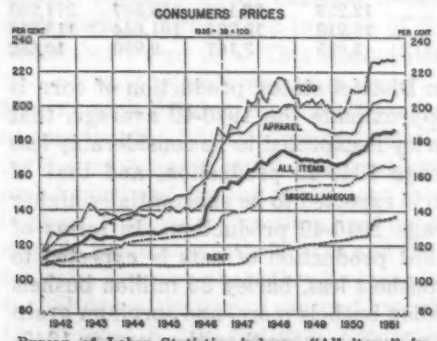
Federal Reserve index. Monthly figures, latest shown is for September, 1951.



Bureau of Labor Statistics' data adjusted for seasonal variation by Federal Reserve. Proprietors and domestic servants are not included. Midmonth figures, latest shown are for September, 1951.



Federal Reserve indexes. Monthly figures, latest shown for sales is September; for stocks, August.



Bureau of Labor Statistics indexes. "All items" includes fuel and housefurnishings groups not shown separately. Midmonth figures, latest shown are for September, 1951.

NATIONAL SUMMARY OF BUSINESS CONDITIONS

By the Board of Governors of the Federal Reserve System

Industrial production and employment have remained somewhat below the advanced levels reached during the spring of this year. Retail sales of some goods have expanded above the reduced second quarter level, while sales of new cars have declined again. Wholesale prices of agricultural commodities have strengthened since early September and the consumers' price index has risen. Common stock prices sold off in the latter part of October.

Industrial Production

The Board's industrial production index was 219 per cent of the 1935-39 average in September, as compared with 217 in August and 223 in April. Continued comparative stability is indicated for October as output of consumer goods in general has apparently remained at reduced levels.

Activity in most industries producing munitions and capital equipment expanded further in September. Production at steel mills increased to 101 per cent of capacity and was scheduled at 102 per cent in October. Output of nonferrous metals increased in late September and early October following production interruptions earlier. Lumber production continued at the curtailed August rate. Auto assemblies changed little, while output of major household durable goods rose moderately from the sharply reduced July-August level.

Output in nondurable goods industries remained about 4 per cent below early spring record levels. There were further curtailments at textile mills. Production of paperboard also continued to decline in September and early October to a rate which was about one sixth lower than in the spring. Output of chemical, petroleum, and rubber products was maintained at recent high levels.

Record production of minerals in September resulted largely from a further expansion of crude petroleum and iron ore. Stocks of petroleum products are currently large, and, effective November 1, allowable crude oil production from Texas fields has been somewhat reduced.

Construction

Value of construction contract awards, according to the F. W. Dodge Corporation, continued to decrease in September, reflecting largely further reductions in public awards from earlier record rates. The total value of construction put in place, allowing for seasonal variation, changed little. The number of new dwelling units started, however, increased somewhat.

Employment

Total employment in nonagricultural establishments, seasonally adjusted, declined slightly further in September, as manufacturing and construction employment decreased and most other lines showed little change. The average workweek at factories changed little and was 40.5 hours, while hourly earnings, after several months of stability, advanced somewhat to a new peak of $1.61. Unemployment continued at the low level of 1.6 million in September.

Agriculture

Crop conditions changed little during September except for slight decreases indicated in cotton and corn prospects. Cattle marketings continued at a reduced rate from mid-September to the third week of October and hog marketings showed little further increase. Total meat slaughtering during this period was 4 per cent below a year ago.

Distribution

Department store sales in September and the first three weeks of October rose less than seasonally but remained somewhat above the reduced second quarter level. Seasonally adjusted stocks at department stores declined further in September. Sales of new passenger automobiles showed a marked decline after mid-September, owing partly to seasonal influences.

Commodity Prices

The average level of wholesale commodity prices increased slightly from mid-September to the fourth week of October, reflecting advances in prices of some agricultural commodities. Prices of hides and textile products declined further and Federal ceilings for lead and zinc were raised but industrial commodities generally changed little.

The consumers' price index rose 0.6 per cent in September, reflecting increases in all groups of items. The most important rise—3 per cent—was shown by apparel.

Bank Credit

Seasonal borrowing at banks to finance the distribution and processing of crops, which had begun in August, accelerated in September and the early part of October. Bank loans to finance direct defense and defense-supporting activities expanded further.

Interest rates charged by commercial banks on short-term business loans averaged 3.06 in September, little changed from the average in June. Rates increased slightly in New York and other northern and eastern cities but declined somewhat in the south and west. In mid-October, leading city banks announced a further increase in the prime rate to business borrowers, from 2½ per cent to 2¾ per cent.

Reserve System holdings of U. S. Government securities increased during late September and early October as a result of purchases in connection with Treasury refinancing operations. Subsequently, however, holdings declined.